

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2005/000753

International filing date (day/month/year)
11.01.2005

Priority date (day/month/year)
27.01.2004

International Patent Classification (IPC) or both national classification and IPC
B01D19/00, B01D69/12

Applicant
MYKROLIS CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2005/000753

AP20 Rec'd 13 JUL 2006

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	6,8,10,12,13,14,15,16,17,18,19,20,22
	No: Claims	1,2,3,4,5,7,9,11,21
Inventive step (IS)	Yes: Claims	12,13,14,15,16,17,18,19,20
	No: Claims	1,2,3,4,5,6,7,8,9,10,11,21,22
Industrial applicability (IA)	Yes: Claims	1-22
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43bis.1 and 70.10)

and / or

2. Non-written disclosures (Rules 43bis.1 and 70.9)

see form 210

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

4820133 13 JUL 2006

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: US-A-4 618 533 (STEUCK ET AL) 21 October 1986 (1986-10-21)
- D2: US-A-5 137 633 (WANG ET AL) 11 August 1992 (1992-08-11)
- D3: PATENT ABSTRACTS OF JAPAN vol. 012, no. 472 (C-551), 9 December 1988
(1988-12-09) & JP 63 190602 A (MITSUBISHI RAYON CO LTD), 8 August
1988 (1988-08-08)
- D4: US-A-5 037 656 (PITT ET AL) 6 August 1991 (1991-08-06)
- D5: WO 01/58577 A (MILLIPORE CORPORATION; MOYA, WILSON) 16 August
2001 (2001-08-16)
- D6: US-A-4 571 244 (KNIGHTON ET AL) 18 February 1986 (1986-02-18)

1. INDEPENDENT CLAIM 1

1.1

The subject-matter of **product claim 1** is partially defined in terms of a process of manufacture thereof, i.e. the membranes surfaces modified by polymerization (...). The product of said production process is not novel merely by the fact that it is produced by means of a certain process, especially as the process of polymerization of one or more monomers deposited on the membrane surface is of customary practice in the art of membrane production.

Claims for products defined in terms of a process of manufacture are allowable only if the products as such fulfil the requirements for patentability.

1.2

With further respect to the clarity objections made under **Item VIII**, 1., the features remaining in **claim 1** are the following

A porous membrane whose surfaces are hydrophilic.

1.3

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 1** is **not new** in the sense of Article 33(2) PCT.

Document D1 discloses

A porous membrane whose surfaces are hydrophilic (col.1, l.6-14).

D2-D5 also disclose the features of **claim 1**, see in particular the passages cited in the International Search Report.

2.

Document D1 also discloses the features of **claims 2 and 4** (see in particular col.1, l.15-17 and col.2, l.35-40), which are therefore not considered to be novel according to Article 33(2) PCT.

3. INDEPENDENT CLAIM 5

3.1

The subject-matter of product **claim 5** is partially defined in terms of a process of manufacture thereof, i.e. a polymerizable composition comprising (...) monomers **deposited** on surfaces (...) and **polymerized** in situ.

The same arguments as mentioned under **Item V**, 1.1 above apply *mutatis mutandis* to the formulation of claim 5, expressed as a product-by-process claim.

3.2

Further applying the clarity objections made under **Item VIII**, 2. the following features to be searched remain in independent claim 5:

A composite porous membrane which comprises:

a polymeric porous membrane substrate having pores between 0.005 and 0.05 μm , the substrate having surfaces modified with amide groups, the amide groups derived from a polymerizable composition comprising one or more amide monomers.

3.3

The document D1 is regarded as being the closest prior art to the subject-matter of **claim 5**, and shows (the references in parentheses applying to this document):

A composite porous membrane (Abstract) which comprises:

a polymeric porous membrane substrate (Abstract; col.1, l.10), the substrate having surfaces modified with amide groups (Abstract; col.1, l.10-13; col.3, l.57-58), the amide groups derived from a polymerizable composition comprising one or more amide monomers (col.2, l.51-53).

The subject-matter of **claim 5** differs from this known composite porous membrane in that the pore size of its membrane is of 0.005 - 0.05 μm , whereas the pore size in D1 is between 0.001 and 10 m.. The range claimed in present application is therefore a subrange of the pore sizes disclosed in D1.

The subrange of D1 is narrow compared to the known range.

But the selected subrange is an arbitrarily chosen specimen from the prior art. Indeed the purpose of the claimed subrange is simply to remove particles of a particular size which is also the purpose of the range of pore sizes in document D1 (see T279/89, Case Law of the Boards of Appeal, 4th Ed. 2001).

The subject-matter of **claim 5** is therefore **not new** (Article 33(2) PCT).

4.

The additional features of the dependent **claims 6-10** are known from the prior art and/or come within the scope of the customary practice followed by persons skilled in the art and do therefore not meet the requirements of the PCT in respect of novelty and/or inventive step (see in particular D1 as cited in the International Search Report)

5. INDEPENDENT CLAIM 12

5.1

The document D6 is regarded as being the closest prior art to the subject-matter of **claim 12**, and shows (the references in parentheses applying to this document):

A process for removing bubbles from a liquid (Abstract) which comprises filtering said liquid with a hydrophilic membrane (Abstract)

The subject-matter of claim 12 differs from this known process in that

it is suitable for filtering microbubbles;
the membrane is a composite porous membrane substrate with an average pore size between 0.01 and 0.03 microns formed of a first polymer, said substrate being directly coated on its entire surface with a cross-linked second polymer formed from a monomer polymerized in situ with a free radical initiator and monomer composition comprising N, N-methylbisacrylamide (MEAM) optionally admixed with dimethylacrylamide (DMAM), said monomer composition being cross-linked in situ on said substrate, said composite porous membrane having essentially the same porous configuration as said porous membrane substrate;

The subject-matter of **claim 12** is therefore **new** (Article 33(2) PCT).

5.2

The problem to be solved by the present invention may be regarded as providing a process for removing microbubbles.

5.3

The solution to this problem proposed in **claim 12** of the present application **does involve an inventive step** (Article 33(3) PCT) for the following reason that no document of prior art containing the missing features, i.e. document D1, contains any hint as to the use of the disclosed membrane for the separation of bubbles.

D1 rather discloses a membrane which is used for the ultra- or microfiltration of solid particles in a liquid (col. 2, l.36-44).

Re Item VI

Certain documents cited

Document D8, the article "Defect Reduction in top antireflective coating", Duffner J., Mykrolis Appl. Note, No. AN1019ENUS, 2004 does not form part of the prior art (Rule 64(3) PCT). It might however become relevant upon entry into the regional phase.

Re Item VII

Certain defects in the international application

The unit **psi** employed in claim 10 and on pages 9 and 14 are not recognized in international practice, contrary to the requirements of Rule 35(12) EPC.

Re Item VIII

Certain observations on the international application

1. INDEPENDENT CLAIM 1

The application does not meet the requirements of Article 6 PCT, because **claim 1** is not clear.

1.1

The feature

the characteristics of the (...) membrane remove microbubbles from a liquid (...)

in the product **claim 1** relates to a method of using the apparatus rather than clearly defining the product in terms of its technical features.

The intended limitation is therefore not clear from this claim, contrary to the requirements of Article 84 EPC.

1.2

The expression

the relative polar interaction and non-polar interactions characteristics

is unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers.

It is indeed unclear from the formulation of the claims how these interactions are defined. It is assumed that the degree of hydrophilicity is meant by the above expression.

2. INDEPENDENT CLAIM 5

It is pointed out that the term "about" used in **claim 5**, especially if applied to a range, renders the meaning thereof unclear according to Article 6 PCT.

3. INDEPENDENT CLAIM 21

The arguments concerning the "polar and non-polar interaction characteristics" used under point 1.2 above apply *mutatis mutandis* to **claim 21**.

Further, the subject-matter of **claim 21** is not clearly defined because it is unclear from the content of said independent claim, which features describe a component in the modified surface of the membrane, from which the presence of amide and methylene moieties can be deducted.

4.

Although **claims 1 and 5** have respectively been drafted as separate independent claims in the same category, i.e. a product claim, they appear to relate effectively to the same subject matter and to differ from each other only with regard to the definition of the subject matter for which protection is sought and in respect of the terminology used for the features of that subject-matter, i.e. the "article" and the composite porous membrane.

The aforementioned claims therefore lack conciseness.

Hence, **claims 1 and 5** do not meet the requirements of Article 6 PCT.

5.

The application does not meet the requirements of Article 6 PCT, because **claims 2, 3** are not clear.

5.1

Claim 2 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

The term "degradation" used in said claim is further vague and unclear and leaves the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering the definition of the subject-matter of said claim unclear, Article 6 PCT. Indeed the term "degradation" has a very broad meaning and a "degradation" can be generated by a large variety of origins.

5.2

Claim 3 and 11 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined.

It is indeed unclear which features of said claim or the claims to which it refers describe a component or a feature in the modified surface of the membrane, from which the presence of amide and methylene moieties can be deducted.

6.

Although **claims 12 and 21** have respectively been drafted as separate independent claims in the same category, i.e. a process claim, they appear to relate effectively to the same subject matter, i.e. a process for removing microbubbles and to differ from each other only with regard to the definition of the subject matter for which protection is sought.

The aforementioned claims therefore lack conciseness.

Therefore **claims 12 and 21** do not meet the requirements of Article 6 PCT.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/US2005/000753

Patent Abstracts of Japan

PUBLICATION NUMBER : 63190602
PUBLICATION DATE : 08-08-88

APPLICATION DATE : 05-01-87
APPLICATION NUMBER : 62000319

APPLICANT : MITSUBISHI RAYON CO LTD;

INVENTOR : MITANI KAZUTAMI;

INT.CL. : B01D 13/00 B01D 13/04 C08F 20/58 C08F 20/58 C08J 9/36 // C08J 7/04 C08J 7/16

TITLE : HYDROPHILIC POROUS MEMBRANE AND ITS MANUFACTURE

ABSTRACT : PURPOSE: To prepare a hydrophilic porous membrane comprising a hydrophilic polymer retained uniformly and firmly on the surface of pores of porous membrane by retaining a hydrophilic crosslinking polymer consisting of diacetone acrylamide and a crosslinking monomer on the surface of pores of a polyolefin porous membrane.

CONSTITUTION: A polyethylene porous hollow yarn membrane is air-dried, heated and heat polymerized after being immersed in the treating solution consisting of diacetone acrylamide, a crosslinking monomer such as N-hydroxymethyl acrylamide or the like, a radical polymerization starting agent and a solvent such as acetone or the like, and a hydrophilic porous membrane comprising a polymer retained on the surface of pores of the porous membrane is prepared.

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